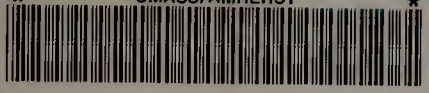


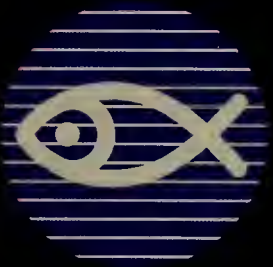
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# A GUIDE TO AQUATIC PLANTS IN MASSACHUSETTS



**New England  
Aquarium**  
CENTRAL WHARF • BOSTON, MA • 02110



**Massachusetts Department of  
Environmental Management**  
Lakes and Ponds Program  
100 Cambridge Street, Boston, MA 02202

**Wanda Kelly**  
*Author*

## **New England Aquarium**

**Jerry Schubel**  
*President and CEO*

**Mike Connor**  
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**Mark Chandler**  
*Research Scientist, Series Editor*

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\* Members of the Sedge Family which are commonly referred to as "rushes". *Juncus* is the only genus listed in the Rush Family. (Fassett, 1957)

## Forward

It is with great pleasure that we present this guide to the common aquatic plants of Massachusetts. The Aquatic Biodiversity Program of the New England Aquarium has been working on the conservation of native biodiversity for close to 6 years now. Focusing work on the more basic research needed to identify trends in local biodiversity, and to develop tools that could be used by a larger community of environmental stewards such as citizen monitoring groups. Over this time period, we have seen a growing awareness of the precariousness of freshwater diversity, documented the decline of some of our native fish, and watched the proliferation of exotic fish and plants throughout the state. Amidst this troubling news, we have also been witness to several positive developments. A growing number of concerned citizens are themselves monitoring ponds and rivers, often working with the assistance of groups such as the Massachusetts Water Watch Partnership (MWWP), Congress of Lakes and Ponds (COLAP), the Department of Environmental Protection (DEP), the Department of Environmental Management (DEM), and the New England Aquarium.

Over the years of working with such citizen groups and students, we have come to develop an understanding of some of the stumbling blocks that may prevent such concerned individuals from attaining their desired contribution towards understanding the diversity of life in the water body they have chosen to study. One area that seemed to be in greatest need for attention was the development of taxonomic guides that were simple yet detailed enough to give the user some sense of having likely identified the life form to some useful end point. In the case of plants, we have a selection of excellent technical guides that are specific to the Northeast but often bewilder the novice taxonomist, or are representative of a larger region and include a great number of species the user is not likely to encounter. On the other hand, there are simple keys, which often do not leave the user feeling that they truly have identified the plant because of the vagueness or lack of details in the drawings or descriptions. To counter this perceived deficit, Wanda Kelly has done an incredible job, spending the better part of two years pulling together the materials necessary for a guide that would be specific to Massachusetts, and be user friendly enough for most interested naturalists. A generous grant from the Sweet Water Trust allowed us to develop this guide with the input of local citizen monitoring groups, and with considerable help from local state agencies and plant taxonomists.

We hope this guide is useful and allows you to further your explorations of local ponds and rivers. We hope to follow this guide with ones on fish and aquatic invertebrates.

Happy trails,

Mark Chandler  
Research Scientist  
New England Aquarium

### **Requests for additional copies:**

New England Aquarium  
Research Dept.  
c/o Aquatic Biodiversity Program  
Central Wharf  
Boston, MA 02110-3399

## Introduction—How to use this guide

This booklet is a key to the common aquatic plants found in Massachusetts. A key is simply a series of questions that will lead you to the identification of an object. This key looks at the shape, color, smell, and habitat of different plants.

There are two basic steps to follow when identifying plants:

- 1- Carefully observe the plant. This includes looking at several samples of the plant to get an average characterization of the plant. This will help you avoid misleading information that you might see if you happen upon the extra large or extra small version of the plant. Also be sure to notice the location of the plant as well as all parts of the plant. Root systems, flowers, seeds and stems are just as important as leaves.
- 2- Answer the questions in the key by using your observations of the plant. In many cases pictures and examples are included to make this process easier. Keep in mind that the illustrations try to capture the average plant so they may not match exactly.

You will find it quick and easy to arrive at a plant's common name, genus and sometimes species.

To get started, the first question concerns the area where you found the plant, its habitat. Is the plant growing underwater (**submerged**), **floating** or sticking up out of the water (**emergent**)? Based on your answer you will be directed to additional questions, each having two parts. If the first part (A) doesn't seem to describe the plant of interest then the answer must be in part (B). When additional questions are needed you will see references that direct you to another question and page. Because each specimen can vary from the ideal plant, there may be times when you feel uncertain as to which answer is best. In those cases, simply follow the (A) answer to the next question or picture. Many times that next question will make it more obvious whether you have chosen correctly. Keep answering the questions until you reach a question that shows an example and has no further questions referenced.

**So what happens when the plant doesn't seem to fit the pictures?** Massachusetts' freshwater bodies contain a great diversity of plants. Several species can only be distinguished from each other by microscopic examination of fruiting bodies and flowers. Biologists with years of experience still have difficulty. Don't be discouraged but remember that those included here are a subset identifiable with the naked eye or magnification of up to 10 times. Simple magnifying loops or hand lenses can be purchased in many children's learning or science stores and will work just fine. So, while the more common plants are included here, **it is possible that your plant may not be listed.** Two additional recommended sources, *Common Marsh, Underwater & Floating-leaved Plants of the United States and Canada* by Neil Hotchkiss and *A Manual of Aquatic Plants* by Norman Fassett, are available for purchase through stores with extensive biology sections, universities or via Internet book sellers. These texts will provide you with further detail and pictures. Both of these sources will also include many plants not found in Massachusetts. The most detailed references for the New England Region are part of a series authored by Hellquist and Crow and are listed in the reference section. These are currently out of print but University of New Hampshire may copy them upon request. If there is high enough demand they may even be encouraged to reprint this informative series.

Should you need further assistance please feel free to send your plant to:

New England Aquarium  
Research Dept.  
C/o Aquatic Biodiversity Program  
Central Wharf  
Boston, MA 02110-3399.

Be sure to wrap the plant in damp paper towels, seal it in a plastic bag, label it with details as to where it was found and mail it (First Class) or hand-deliver it to the Aquarium Research Department. Since many species require seeds and flowers for identification, please include as much of the plant as you can. In some cases it will not be possible to get down to the species level. Please include your name, telephone number, and address.

Another resource is

Dr. Rick McVoy  
DEP/Div. Watershed Management  
627 Main St., 2nd Floor  
Worcester, MA 01608  
508-767-2877  
email: Richard.Mcvoy@state.ma.us



Please take special notice of the symbol species that are found outside their native habitat. Many exotics have been imported and are of southern and European origin. In many cases, they can cause problems in a pond or lake because of their rapid growth. If you see any of these plants you should contact Dr. Rick McVoy at the above DEP address. The DEP maintains an extensive database to track these exotics. They are not dangerous to humans, but they should be monitored in order to protect the native species and ecosystems in the area.

I can't thank the New England Aquarium enough for the opportunities they provided for me to explore and discover the world of aquatic plants. A special thanks to Mark Chandler in the Edgerton Research Lab because without his encouragement I would never have taken the time to realize the beauty of the freshwater systems in Massachusetts.

Also, thank you to the experts--Dr. C. Barre Hellquist, Dr. Rick McVoy, and Robert Hartzel -- for taking the time to review and make detailed content suggestions. William King, a member of the Chandler Pond Preservation Society field-tested the guide, a critical step in improving usability. All projects need financial support and thanks should go to the Sweetwater Trust for their supporting grant.

Despite my best efforts, there may be errors herein, for which I apologize. In some cases sources differ as to common names and even taxonomic classification. I tried to include as many notations as possible without making the key cumbersome. Please send corrections or questions to the New England Aquarium so future editions can be improved.

Drawings included are by Abigail Rorer and are property of the United States Government.

Selected drawings from Fassett, N. C. *A Manual of Aquatic Plants*. Copyright 1957,1985. Reprinted by permission of the University of Wisconsin Press.

**Have fun exploring!!** I hope you enjoy the diversity and beauty of these unique plants as much as I have.

Wanda Kelly

## A Guide to Aquatic Plants in Massachusetts

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**1A. Submerged**      Plants growing completely beneath the water's surface. Flowers may appear above the surface floating on the water accompanied by small leaves for support. The majority of the leaves remain submerged.  
.....See question **2A.** page 7

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**1B. Floating-leafed**      Plants with at least some leaves floating on the water's surface, with or without flowers.....See question **15A.** page 19

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**1C. Emergent**      Plants with their leaves out of the water, but still rooted to the pond bottom  
.....See question **22A.** page 23

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**SUBMERGED PLANTS**

**2A.** Basal leaves are present; that is, all leaves emerge from the base of the plant.....See question **5A.** page 8



**2B.** Leaves are positioned on a stem, or appear as mere bumps on a stem.....See question **3A.** page 7

**3A.** Leaves are mere bumps.

◆ **Leafless Milfoil**  
(*Myriophyllum tenellum*)



Waterline

Found in shallow water and may emerge when flowering, although flowering is rare.

Small bumps on stems are actually leaves. In many cases the tip of the plant is slightly curved and looks like a hook.

Note the root system which connects several stems together. It is rare to find only one stem.

**3B.** Leaves are more well defined.....See question **4A.** page 7

**4A.** Leaves are flattened and undissected, showing no divisions, but may have toothed margins. See examples below.....See question **6A.** page 11



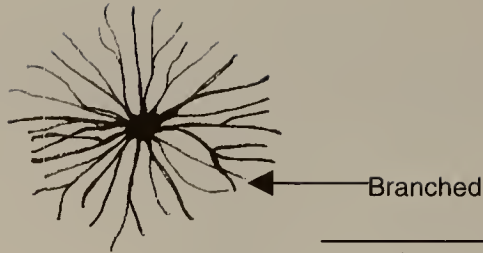
**4B.** Leaves are finely dissected, that is they are made up of small divisions. These divisions can appear as spikes connected to a mid-stem or vein, much like a feather, or they can look like a tree branch without leaves. In all cases the leaves are not flat.....See question **11A.** page 15



Feathered

These divisions do not have to be exactly opposite each other.

**SUBMERGED PLANTS**



**5A. Submerged plants with short**

basal leaves. Leaves are **not** limp or ribbon like.

◆ **Pipewort (*Eriocaulon*)**



Two species are present in Massachusetts.

Flowers are necessary for species identification.

*Eriocaulon aquaticum* is the most commonly found species.

When held to the light, leaves will have cross veins.

In shallow water, Pipewort may grow an emergent button-like white flower. The separate flower stalk can grow to be 3' to 6' long.

Key feature--white roots with cross lines.

◆ **Quillworts (*Isoetes*)**



Like Pipewort but **no** cross lining on the roots.

Leaves taper to a sharp point.

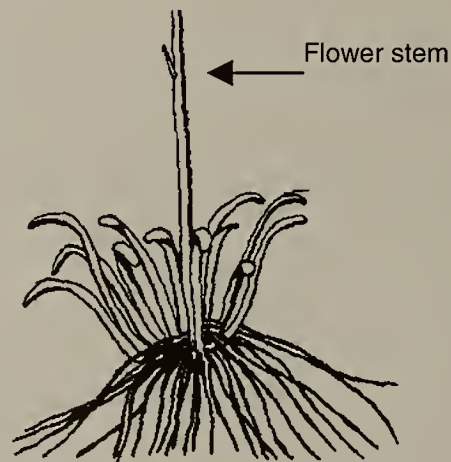
Look for an enlarged base containing spores.

Both plants have leaves that grow to be 1½" – 3" high.

◆ **Water Lobelia (*Lobelia dortmanna*)**

Each leaf consists of two tube like structures.

Another key feature is the curve or arch at the tip of each leaf.



**5B. Submerged plants with long thread or ribbon like basal leaves.**

Six different plants are included here, two thread like and four ribbon like. Many of them can be found in either a submerged or emergent form. Where applicable, pictures of each form are shown.



◆ **Rush or Sedge (*Juncus* or *Eleocharis*)**

Although listed here with the basal-leaved plants, the true leaves of this plant are really sheaths at the base of the stems. What appear to be leaves are really stems.

These plants are smaller, and many times sterile, versions of emergent plants. They appear thread-like (as opposed to ribbon-like) and limp. One difference between a Rush and a Sedge is the shape of the stem. Sedges are triangular and Rushes are round. This is difficult to observe in the submerged forms.

## SUBMERGED PLANTS

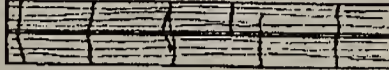
Four different **ribbon-like** plants are included in this category and can be distinguished by holding the leaf up to sunlight and comparing to the samples below.

### Wild Celery



Two distinct patterns

### Arrowhead



Central vein  
Broad sections

### Pickerelweed



Central vein  
No broad sections

### Burreed



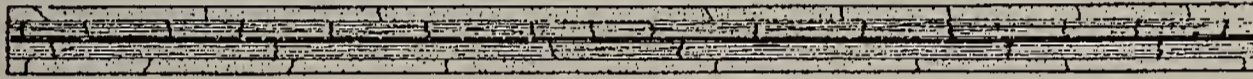
No central vein  
No broad section

### ◆ Wild Celery (*Vallisneria americana*)

There is no emergent form but the tape-like leaves can reach the water's surface. The flowers are borne on corkscrew-like stems that reach the surface.

Leaves are ½"--1" wide.

When held up to the sunlight, two distinct patterns can be seen on the leaf.

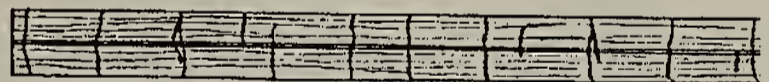


Waterline

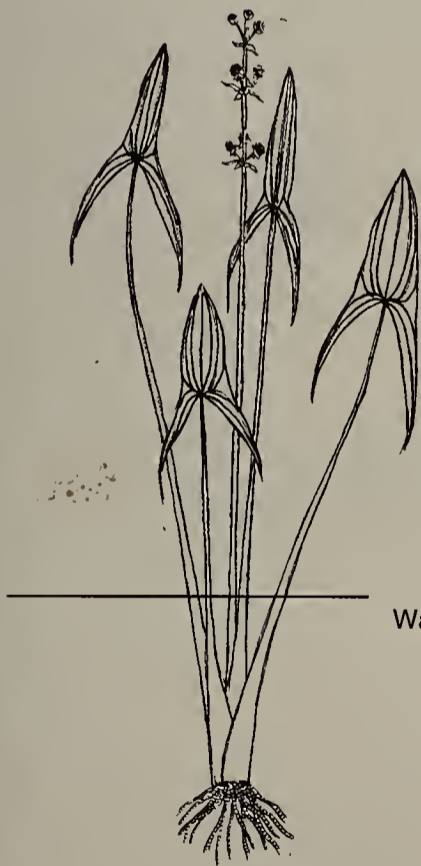


### ◆ Arrowhead (*Sagittaria*)

When viewed in sunlight, leaves have central a vein and broad cross sections.



Submerged form-often a sterile form of the plant.



Waterline

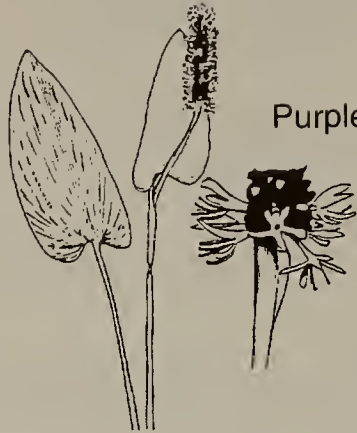


# SUBMERGED PLANTS

## ◆ Pickerelweed (*Pontederia cordata*)



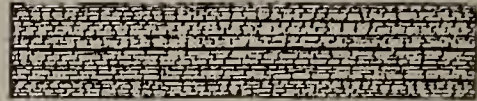
Submerged Form



Purple flowers

Emergent Form

When viewed in sunlight, leaves have a central vein but no broad cross sections.



## ◆ Burreed (*Sparganium*)



Submerged Form



Emergent Form

When held up to the sunlight, these submerged leaves have no central vein and no broad cross sections.



**SUBMERGED PLANTS**

**6A.** Submerged plants with flattened, undissected (no divisions are present) appearing in whorls around the stem.

◆ **Waterweed (*Elodea*)**

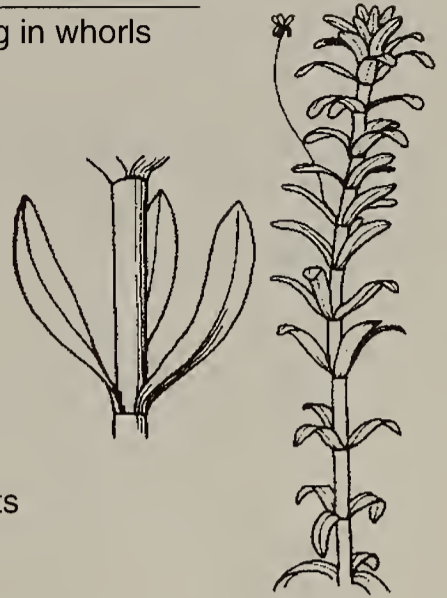
Two species of Waterweed are present in Massachusetts.  
Each whorl has 3 or 4 leaves that are 1/2"--1" in length.

***Elodea nuttallii***

Leaves are 1/32"--1/16" wide with pointed tips.

***Elodea canadensis***

Leaves are 1/16"--3/16" wide with blunt tips



◆ Also see **Bushy Pondweed (*Najas*)** under question **8A.** page 11. This group of plants appear whorled due to the close clusters of opposite leaves--don't be fooled.

**6B.** Leaves are arranged along a stem, singly or in pairs.....See question **7A.** page 11

**7A.** Leaves are arranged in pairs with each leaf of a given pair on opposite sides of the stem.  
.....See question **8A.** page 11

**7B.** Whole leaves arranged singly along the stem.....See question **10A.** page 12

**8A.** Leaf margins have teeth which are visible under magnification. Leaves are narrow, ribbon like and enlarged at the base.

◆ **Bushy Pondweed (*Najas*)**

There are four species of *Najas* that can be found in Massachusetts. They are distinguished from each other by the shape of the leaf base and the arrangement of teeth along the leaf edge. A generalized picture of the plant is provided below along with detail pictures of each leaf type.

	Leaf bases tapered.		Leaf bases lobed.	
	<i>N. guadalupensis</i>	<i>N. flexilis</i>	<i>N. gracillima</i>	<i>N. minor</i>
	20 or more teeth along each margin	Leaf tapers to a long curved tip.	6-20 teeth	6-15 teeth

**8B.** Teeth are not visible under magnification.....See question **9A.** page 12

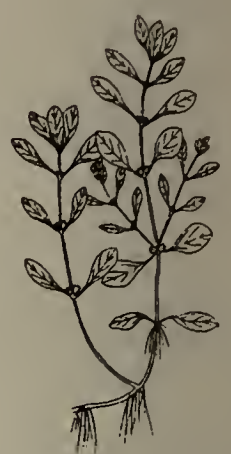
**SUBMERGED PLANTS**

**9A.** Leaves are larger than 3/8" in length. (3/8"= ———) and are paddle or lance shaped.



◆ **Water Starwort (*Callitriche*)**  
 Multiple shapes of leaves can be found on the same plant.  
 Nearer the surface, the leaves are paddle shaped.  
 The more submerged leaves are lance shaped and about 1" long by 1/32" wide.  
 Water Starwort is often found as a small plant in shallow water with a rosette of leaves forming near the water's surface.

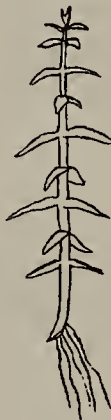
◆ **False Loosestrife (*Ludwigia*)**  
 This plant can be found submerged and emergent. It takes the same form in either habitat.  
 Opposite, paddle shaped leaves, are green to reddish in color.



**9B.** Leaves are 3/8" (———) or smaller in length. Plants are small overall.

◆ **Hedge Hyssop (*Gratiola*)**

Erect, stiff plant with sharply point leaves.  
 Every other pair of leaves is off set from the previous pair by 90 degrees.  
 Leaves are 3/16" ( — ) or less in length.



◆ **Waterwort (*Elatine*)**

Dwarf plant with leaves 3/8" ( —— ) or less in length.



**10A.** Leaves have no mid-vein when viewed under 10X or higher magnification.

◆ **Waterstar Grass (*Heteranthera dubia*)**



Leaves are narrow measuring 1/16"-1/8" wide.  
 Leaves are 3"-4" long and form a sheath around the stem.  
 Plants can grow up to 3' tall and are sometimes found sprawling along the mud.  
 Flowers are yellow when present.

◆ **Moss (*Musci*)**

Found as a mat on the pond bottom or attached to rocks. Usually appears black but may have tips of green.



## SUBMERGED PLANTS

**10B.** Leaves have a mid-vein when viewed under 10X or higher magnification.

There are 33 species of pondweeds found in Massachusetts. As a group, they can be distinguished by the presence of a mid-vein and a small fragile leaf-like structure found at the base of each regular leaf called a stipule. The leaf width varies greatly and in many cases a seed or fruit is needed to distinguish between species.

Ten species can be identified without fruits and are listed below. They are listed in order based on the average size of the submerged leaves, starting with the larger leafed species.

Magnification is necessary in thin leafed species, which can look like Waterstar Grass (see page 12). Only two thin leafed species are included here as examples. In most cases you will not be able to identify these beyond noting that they are a thin-leafed variety.

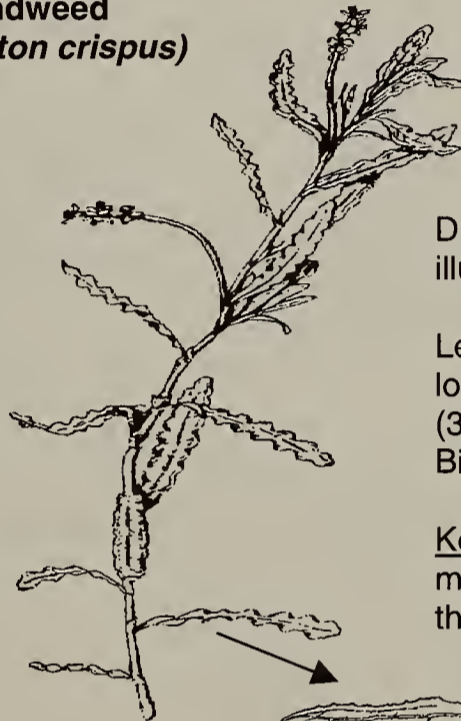
◆ **Big-leaf Pondweed**  
(*Potamogeton amplifolius*)



Large arched leaves with wavy edges.

The leaves appear reddish brown to brown and are 3"-4" long and up to 2" wide.

◆ **Curly Pondweed**  
(*Potamogeton crispus*)



Distinct veining, as illustrated below.

Leaves can be up to 3" long but are much thinner (3/4") than those of the Bigleaf.

Key feature--toothed margins on wavy, hence the name curly, leaves.

◆ **Redhead-grass**  
(*Potamogeton richardsonii*)



Look for 2"—4" wavy edged, lance shaped leaves. Another identifying feature are the 3--7 prominent nerves found in the leaves.

◆ **Heartleaf Pondweed** (*Potamogeton pulcher*)

This pondweed is similar in shape to Oakes and Floating-leafed Pondweeds (page 14) It's floating leaves are the same size as Oakes ( 1/2"-- 2 1/2" long and up to 1" wide).

It has heart or wedge shaped floating leaves that are wider near the base than the leaf tip.

Distinguishing features are broad, flat submerged leaves that appear ragged and wrinkled. Black dots appear on the stems.



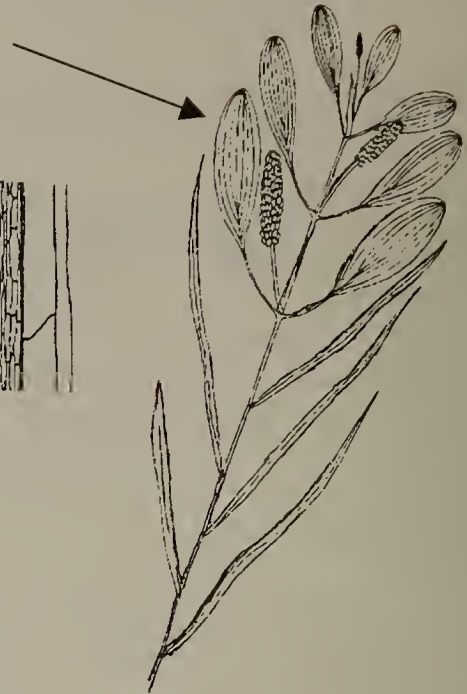
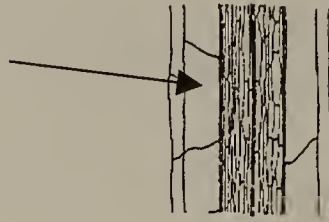
**SUBMERGED PLANTS**

◆ **Ribbonleaf Pondweed (*Potamogeton epihydrus*)**

If floating leaves are present they are between  $\frac{3}{4}$ "— $3 \frac{3}{16}$ " long and up to  $1 \frac{3}{8}$ " wide. A light colored center strip is present on the limp, submerged leaves which are  $\frac{1}{16}$ "— $\frac{3}{8}$ " wide and several inches long.



Light strip



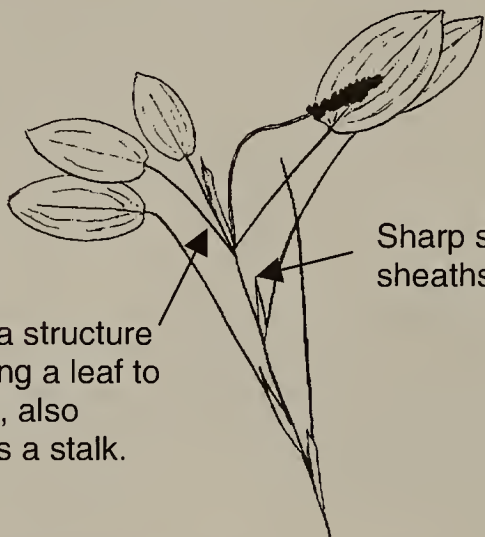
◆ **Fern Pondweed (*Potamogeton robbinsii*)**

Leaves extend stiffly in opposite directions and appear flattened.

The leaf base makes a sheath around the stem.

Leaves are  $\frac{1}{8}$ "— $\frac{5}{16}$ " wide and several inches long. When magnified, fine serrations can be seen.

◆ **Floating-leafed Pondweed (*Potamogeton natans*)**



Petiole--a structure connecting a leaf to the stem, also known as a stalk.

Sharp stipules or sheaths.

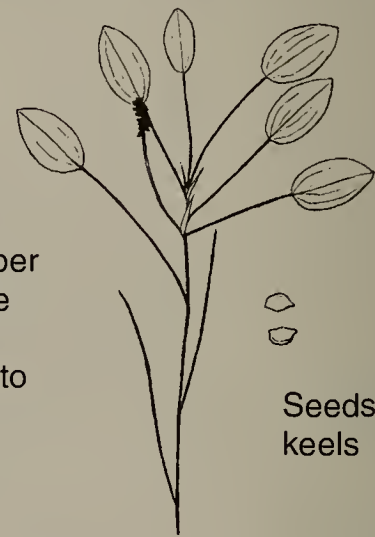
Floating leaves are almost always present and are 2"— $3 \frac{1}{2}$ " long, 1"— $2 \frac{1}{2}$ " wide, with a notched or heart shape base. Lighter coloration can be seen at the petiole and leaf junction.

Narrow, stem-like submerged leaves.

This variety is often found in 2'—3' of water.

The distinguishing feature is sharp stipules.

◆ **Oakes Pondweed (*Potamogeton oakesianus*)**



Floating leaves taper into the petiole, the structure that connects the leaf to the stem.

Seeds with keels

Oakes Pondweed looks like a smaller version of the Floating-leafed species. The floating leaves are about half the size ( $\frac{1}{2}$ "— $2 \frac{1}{2}$ " inches long and up to 1" wide.)

Narrow, stem-like submerged leaves.

This variety is often found in 2'—3' of water.

The distinguishing feature is the seed, which is obviously keeled.



## SUBMERGED PLANTS

### ◆ Variable Pondweed (*Potamogeton gramineus*)

Leaves vary greatly and range from ½"—4" in length.

Plants are heavily branched with many leaves as compared to other species in this genus.



### ◆ Sago Pondweed (*Stuckenia pectinatus*) (previously known as *Potamogeton pectinatus*)

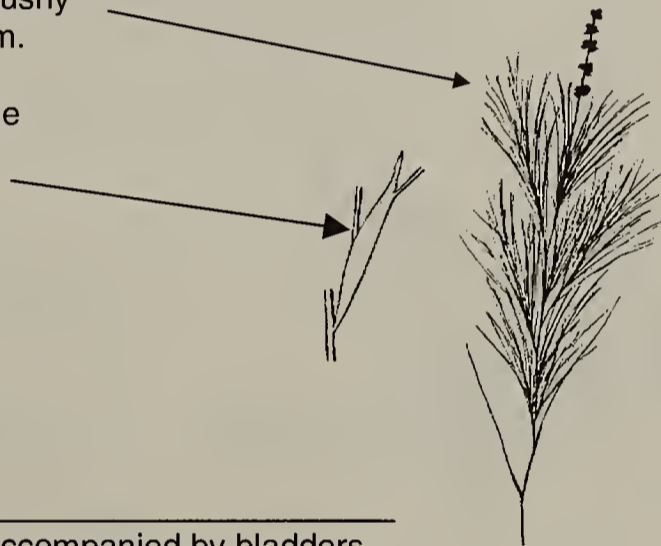
Leaves are very narrow and pointed.

Leaves are round in cross section and only 1/32" wide.

Unlike other Pondweeds, this species has bushy clusters of leaves toward the end of the stem.

This species has the usual Pondweed stipule but it forms a sheath by uniting with the leaf base.

If seeds are present, they have pointed tips



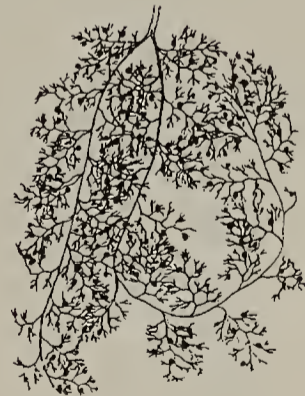
**11A.** Leaves are dissected (showing many divisions) and are accompanied by bladders. These bladders are round to kidney shaped structures and can be mixed in with the leaves or on separate branches.

**Bladderworts (*Utricularia*)** see next page for species identification.

There are several species of bladderworts in Massachusetts and only those that can be identified without microscopes are included in this key.

Leaves are actually stems. They are finely divided, with forked branching and, grow along the main stem.

Stem-like leaves have numerous small "bladders". If for some reason the bladders are missing, this plant can be easily mistaken for Milfoil or Coontail. Look carefully and find several samples if possible.



**SUBMERGED PLANTS**

◆ **Common bladderwort (*Utricularia vulgaris*)**

The biggest bladderwort.

It is not uncommon to find 2½" stem-like leaves making the plant 4"--5" across.

Bladders are large and the tip of the plant has a tuft of branches.

When present, flowers are yellow.



◆ **Purple bladderwort (*Utricularia purpurea*)**

This bladderwort has clusters of branches with the bladders at the very tips of the branches.

When present, flowers are purple.



◆ **Little Floating bladderwort (*Utricularia radiata*)**

Yellow flowers stand above a whorl of swollen, oblong leaves which serve as pontoons.

The underwater portion resembles Common Bladderwort but the leaf forks are more zigzag.

Bladders only appear on underwater leaves.



◆ **Flatleaf bladderwort (*Utricularia intermedia*)**

Two types of branches appear. One is thickly branched, forked and blunt tipped. The second type, appearing root-like, bears the bladders. When present, flowers are yellow.

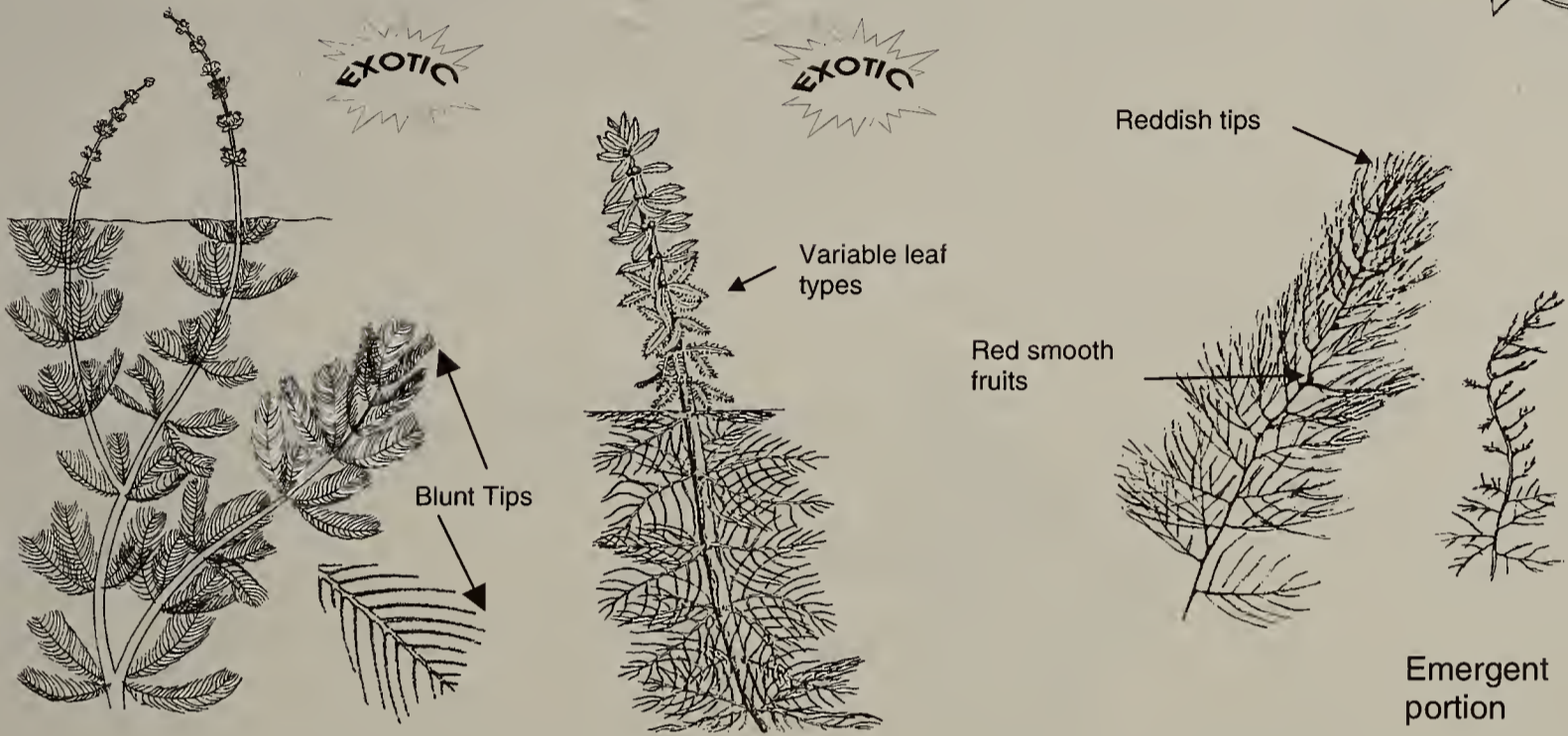


**SUBMERGED PLANTS**

**11B.** Leaves are dissected (showing many divisions) and are not accompanied by bladders. Look carefully at all the characteristics of the plants listed. Bladderworts sometimes lose their bladders and can be confused with Milfoil or Coontail. ....See question **12A.** page 17

**12A.** Leaves look like a feather with each leaf made up of leaflets coming off a main rib.

◆ **Water Milfoils (*Myriophyllum*)** There are several water Milfoils found in Massachusetts.



◆ **Eurasian Milfoil (*Myriophyllum spicatum*)**

Leaves are blunt-ended as if cut by a scissor and can be up to 2" in length.

Each leaf has 11 leaflets per side.

Leaves in whorls of 3-6.

Plants appear red tipped.

◆ **Variable Milfoil (*Myriophyllum heterophyllum*)**

Stems are often thick and red, with multiple leaf forms on one stem.

Submerged leaves are 2" long and 1" wide.

Leaves are in whorls of 4-6.

◆ **Low Water Milfoil (*Myriophyllum humile*)**

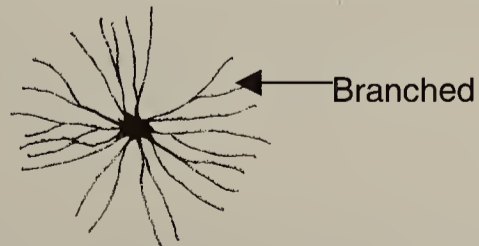
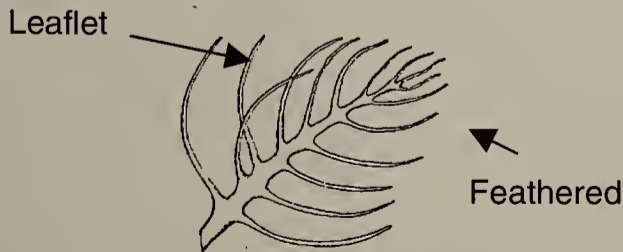
Stem thinly covered with limp leaves.

Smooth reddish fruits in the axils of the submerged leaves.

Plant may appear red tipped.

When emergent, tiny green lobed leaves will appear above the water.

**12B.** Leaves are not feather like but are branched.....See question **13A.** page 18

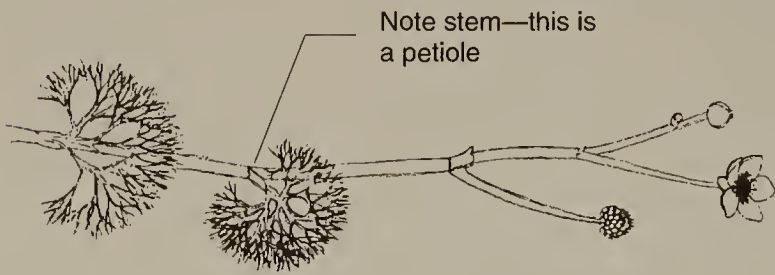


**SUBMERGED PLANTS**

**13A.** Leaves appear singly along the plant's main stem.

◆ **Water Buttercup (*Ranunculus*)**

There are 3 species of water buttercups in Massachusetts.



This plant can be found trailing just below the surface and can be several feet long.

At the base of each leaf there is a small stem or stalk before the leaf begins.

Flowers are white.

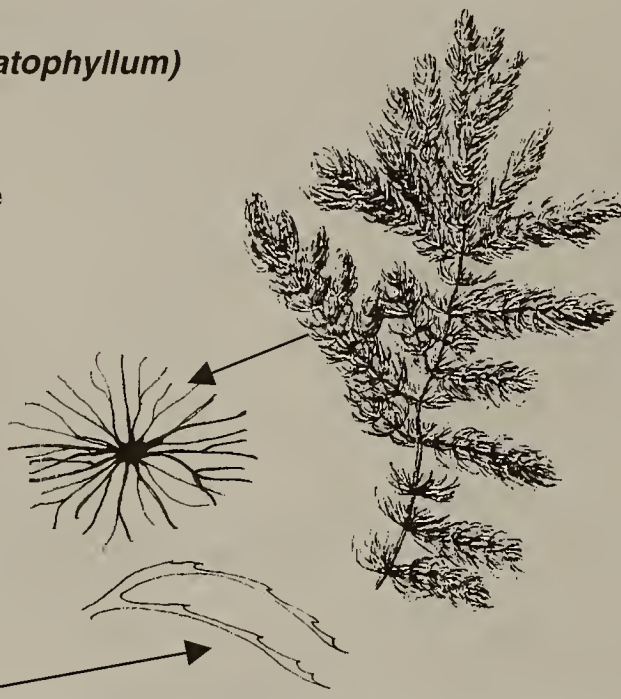
**13B.** Leaves appear in pairs or whorls along the plant's main stem.....See question **14A.** page 18

**14A.** Leaves are in whorls along the plant's main stem.

◆ **Coontail (*Ceratophyllum*)**

Leaves are in a whorl around the stem with each leaf dividing.

The ends of the branches have clusters of whorls giving the plant the appearance of a raccoon's tail.



Look for teeth on one side of the leaf to avoid confusing this with a Bladderwort that has few bladders.

◆ **Water Marigold (*Megalodonta beckii*)**

The leaf divides repeatedly and no petioles are present.

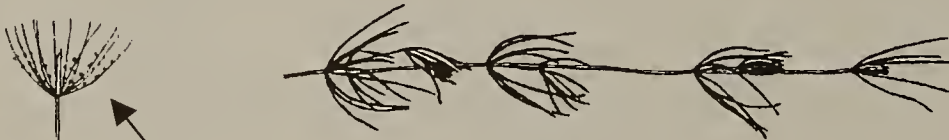
See the Water Buttercup above for an example of a petiole.

This plant can grow several feet tall and may emerge, showing a yellow flower.



◆ **Stonewarts (*Chara* or *Nitella*)**

These are forms of algae and are found in tangled mats along the pond or lake bottom. They have the same general appearance. *Chara* has a distinctive musky odor and is brittle to the touch while *Nitella* is smooth and flexible



Note scaly coating of calcium deposits may often be found on *Chara*.  
***Chara* (Muskgrass)**



***Nitella***

**SUBMERGED/FLOATING-LEAFED PLANTS**

**14B.** Leaves are in pairs, with each leaf in a pair opposite the other.



Note the opposite arrangement of leaves.

◆ **Fanwort (*Cabomba caroliniana*)**

The key feature is fan like leaves appearing on the stem in pairs.

In late summer this plant will surface and produce tiny white flowers with oval floating leaves.

Fanwort produces long stems that are found floating just under the water's surface and is often found in shallow water in thick mats.

**FLOATING-LEAFED PLANTS**

**15A.** Plants with floating and submerged leaves, each leaf type with a different shape.

.....See question **16A.** page 19

**15B.** Plants with only floating leaves, or leaves that appear to be floating and submerged but are of identical shapes.....See question **18A.** page 20

**16A.** Floating leaves form a rosette.

◆ **Water Starwort (*Callitriche*)**



Thin leaves in pairs and tiny round leaves at the surface.

Leaves near the surface are paddle shaped.

◆ **Water Chestnut (*Trapa natans*)**



Rosettes of floating leaves with shiny upperside and fine hairs on underside.

Submerged leaves are feather-like and whorled around the stem. A four barbed, one inch fruit may be attached.

**16B.** Floating leaves do **not** form a rosette.....See question **17A.** page 20

**FLOATING-LEAFED PLANTS**

**17A.** Emergent and floating leaves are serrated or deeply lobed.



◆ **Mermaid Weed (*Prosperinaca palustris*)**

These plants are noted for their variety of leaf forms on the same plant. Submerged leaves are deeply divided while the emergent leaves are not divided but do have serrations.

If emergent leaves are not present this can resemble Milfoils which are members of the same family. The key difference is the arrangement of leaves—Mermaid Weed leaves are alternate and not whorled.

**17B.** Floating leaves are not serrated and plants look like those below.

These leaves can be ½" – 4" long.....See question **10B.** page 13



**18A.** Plants are **not** rooted to the bottom of the pond or lake.

Very small floating plants, not rooted to the pond bottom.



◆ **Duckweed (*Lemna*)**

Only one root on underside.  
Green on underside.

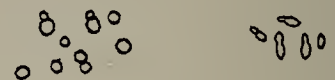
**Size range:** 1/16"-3/16"



◆ **Big Duckweed (*Spirodela polyrhiza*)**

Several roots on underside.  
Distinctive red spot on each leaf  
Underside is also red.

**Size range:** 1/8"—3/8"



◆ **Watermeals (*Wolffia*)**

**Size range:** 1/32"—1/16"

**18B.** Plants are rooted to the bottom of the pond or lake.....See question **19A.** page 20

**19A.** Leaves are ribbon-like and extend from the pond bottom to the water's surface...See question **5B.** page 8

**19B.** Leaves are not ribbon-like but are on stems that are rooted to the bottom.....See question **20A.** page 21

**FLOATING-LEAFED PLANTS**

**20A.** Leaves are lance-shaped.  
 ◆ **Water Smartweed (*Polygonum*)**



Lance-shaped, alternating leaves attached at swollen joints on stem.  
 Leaf lengths are less than 10X the leaf width.  
 When present, flowers are small, pink and appear in a cluster.

**20B.** Leaves are broad or elliptical.....See question **21A.** page 21

**21A.** Stems are attached to the middle of the leaf and the leaf is without any cuts that form lobes or a heart shape.

◆ **Watershield (*Brasenia schreberi*)**



Leaves are 2"--3" long with a jelly-like substance on the underside and stem of the plant.

Dull red flowers may be present.

◆ **American lotus (*Nelumbo lutea*)**

Large, typically 6"--24" wide, circular leaves.

When present, flowers are yellow.



**21B.** Stem is attached closer to the lobed end of the leaf . The leaves are also cut to form lobes or a heart shape.

◆ **White Water Lily (*Nymphaea odorata*)**

Large round leaves with pointed lobes and white flowers.

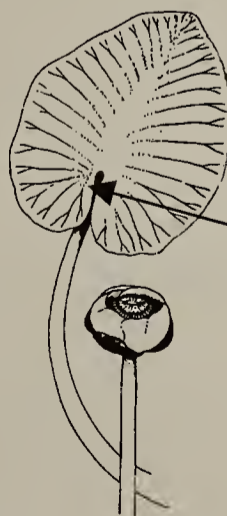


*Nymphaea* has veins that radiate from where the stem attaches.

Lobes rarely overlap.

◆ **Yellow Water Lily (*Nuphar variegatum*)**  
 (also known as Cow Lily and Spatterdock)

Large, 6<sup>3</sup>/<sub>4</sub>"-7 <sup>5</sup>/<sub>8</sub>" round leaves with round lobes and yellow flowers.



Lobes often overlap.

A center vein is prominent in *Nuphar*.

## FLOATING-LEAFED PLANTS

### ◆ Little Floating Heart (*Nymphoides cordata*)



Leaves are the size of a silver dollar.

White flowers are much smaller than the White Water Lily.

Roots may be found in a bunch on the stem just below the waters surface.

A similar, yellow flowered species, *Nymphoides peltata* is rarely found in Massachusetts but its presence should be noted. It is exotic and lacks the root bunches found on the stem of *N. cordata*.

EXOTIC



**EMERGENT PLANTS**

Plants that are rooted to the bottom of the pond or lake and have leaves that extend out of the water. Since many of these plants grow near the water's edge, they can be completely out of the water during drought conditions. This section includes the **rushes, grasses, and sedges**. These are among the most difficult to distinguish at the species level. The more obvious ones are included here but **beware** that you will encounter many plants that are not included here.

22A. Leaves are long and narrow or non existent.....See question 23A. page 23

22B. Leaves are broad or lance shaped.....See question 29A. page 27

23A. Leaves are long and narrow.....See question 24A. page 23

23B. Leaves are non existent.....See question 28A. page 25

24A. A ligule (appendage at the site where a leaf joins the stem) is present



◆ **Reed (*Phragmites australis*)**

Found in colonies, this reed ranges from 6'-12' tall.

Grayish green leaves are up to 24" long and 2" wide.

Flower head is purplish when young, turning white and fluffy when older.

This is the only member of the Grass Family included. It is a species that is easily identified and is of importance due to its rapid growth. For additional grasses, see the keys referenced at the end of this key.

24B. A ligule (appendage at the site where a leaf joins the stem) is absent.....See question 25A. page 23

25A. Stem is round.....See question 26A. page 23

25B. Stem is triangular.....See question 27A. page 24

26A. Round stems that are hollow and jointed

◆ **Three Way Sedge (*Dulichium arundinaceum*)**

Plants grow to 3' tall with stiff flat leaves coming off three sides of the stem. This is easier to see if you look down on the top of the plant.

Leaves are 2"—5" long and less than 3/8" wide.

Flowers appear in July and August, hidden in the linear spikelets in the upper leaf axils (place where the leaves meet the stem).

Notice the conspicuous sheath on the stems.



**EMERGENT PLANTS**

**26B. Round solid stems**

◆ **Cat Tail (*Typha*)**



Cat tails are recognized by the brown cylinders found on the stems. These are the fruits.

It is difficult to distinguish specific species. Two species (*Typha latifolia* and *T. angustifolia*) are common and have been known to hybridize to form a third species. Their differences are indistinguishable by the naked eye.

◆ **Canada Rush (*Juncus canadensis*)**



The leaves of this particular Rush are round in cross section.

This species grows to 3' tall and is found in small groups.

**27A. Spikes of scales/flowers or burrs growing in a ball shape**

◆ **Sedges (*Carex*)**



**Three types of sedges**

Notice the variation in the spikes. In all cases spikes are elongated. Compare these to the shorter more compact spikelets of the Canada Rush shown above or the Twig Rush on the following page.

◆ **Burreed (*Sparganium*)**



Plants can grow to 4' tall.

Leaves can be submerged and emergent. When submerged they are limp. When emergent they are triangular in cross section and keeled along the back.

Fruits are needed to identify to species level.

**EMERGENT PLANTS**

**27B.** Spikelets are found on a triangular stem.

Leaves 8" long

◆ **Twig Rush (*Cladium*)**



The key to this identification is the groove found on the base of the leaf. The tips of the leaves may be rolled inward.

Leaves 16"-18" long

With sharp tip  
◆ **American Bulrush (*Scirpus pungens*)**



This triangular stem has sharp angles as well as a sharp tip. The leaves are long and ribbon like at the base but shorter when found higher up on the stem.

Without sharp tip  
◆ **Wool grass Bulrush (*Scirpus cyperinus*)**



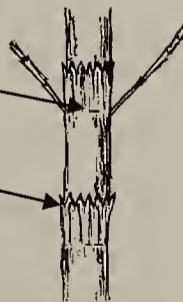
Oval woolly spikelets give this plant its common name. The leaves are long, narrow and rigid.

**28A.** Leaves non existent and branches are in whorls.

◆ **Horsetail (*Equisetum*)**



Hollow stems with conspicuous joints and toothed sheath



Branches can curve up or down.

**EMERGENT PLANTS**

**28B.** Leaves are non existent and branches are **not** in a whorl.

◆ **Rush (*Juncus*)**



Look for a round stem, 3/8"--1" thick with vertical lines or ribs.

A single cluster of flowers appears 1/3 of the way down the stem.

This plant often grows in a dense cluster called a tussock.

◆ **Spike Rush (*Eleocharis*)**

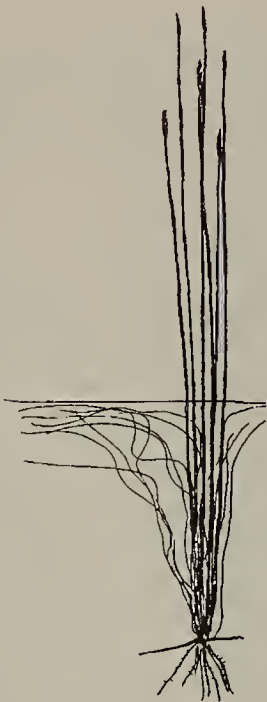


Soft green stems grow in clumps.

Oval spikelets are found on stem tips.

Two species are shown. The taller, Beaked Spike-rush can grow to 3 1/2' tall. The second, Dwarf Spike-rush, is usually less than 3" tall.

Many more species can be found in Massachusetts. Detailed inspection of the spikelet is needed to identify the plant to species level.



Both *Juncus* and *Eleocharis* have submerged and emergent forms depending on the individual species.

The picture to the left illustrates a typical plant exhibiting both forms.

◆ **Softstem Bulrush (*Scirpus tabernaemontanii*)**

Round soft stems grow to be 8' tall and 3/4" thick. Look for drooping oval spikelets appearing in clusters.



**EMERGENT PLANTS**

**29A. Leaves broad with lobes.**

◆ **Arrowhead (*Sagittaria*)**

Key feature—pointed triangular lobes and veins radiating from one point and curve up and down.

Different species have different leaf shapes. They are often arrowhead shaped or elliptical. A few variations are illustrated here.

Flowers are white.



◆ **Arrow Arum (*Peltandra virginica*)**

Key feature—rounded triangular lobes and veins radiating from a central vein **not** a central point.

A vein outlines the leaf.

Like Arrowhead, the leaves can take various forms but always have the key features mentioned above.

Flowers are green.



◆ **Pickerelweed (*Pontederia cordata*)**

Rounded lobes with veins radiating from one point and curving upward.

**EMERGENT PLANTS**

**29B.** Leaves are broad but not lobed. Leaves can be alternating, opposite or whorled.

◆ **Smart Weed (*Polygonum*)**



Leaves are alternating, lance shaped, 4"--6" long and 1-- 1¾" wide.

Flowers are found in spikes and are white or pink.

Several species have pinhole size glands on the leaves. Others will also have spines on the stems.

◆ **False Loosestrife (*Ludwigia*)**



Leaves are opposite, paddle shaped leaves that are green to reddish in color.

Leaves can be found submerged and emerging. This is due to the roots found along the stem which cause the plant to sprawl and form mats.

◆ **Purple Loosestrife (*Lythrum salicaria*)**



Leaves are opposite but sometimes found in whorls of three.

Up to 4" long, the leaves are heart shaped at their base. Stems are waist high and are covered with fine hairs.

Flowers are purple.

◆ **Swamp Loosestrife (*Decodon verticillatus*)**



Leaves are opposite or in whorls of three

Up to 4" long, the leaves taper to a point. These can be distinguished from Purple Loosestrife by the absence of a heart shaped base and the presence of a short petiole (stalk at the base of the leaf).

The pink flowers appear in the axils (joints) of the leaves and **not** in a spike at the branch tip.

The stem, at the water line and below, is spongy

## References:

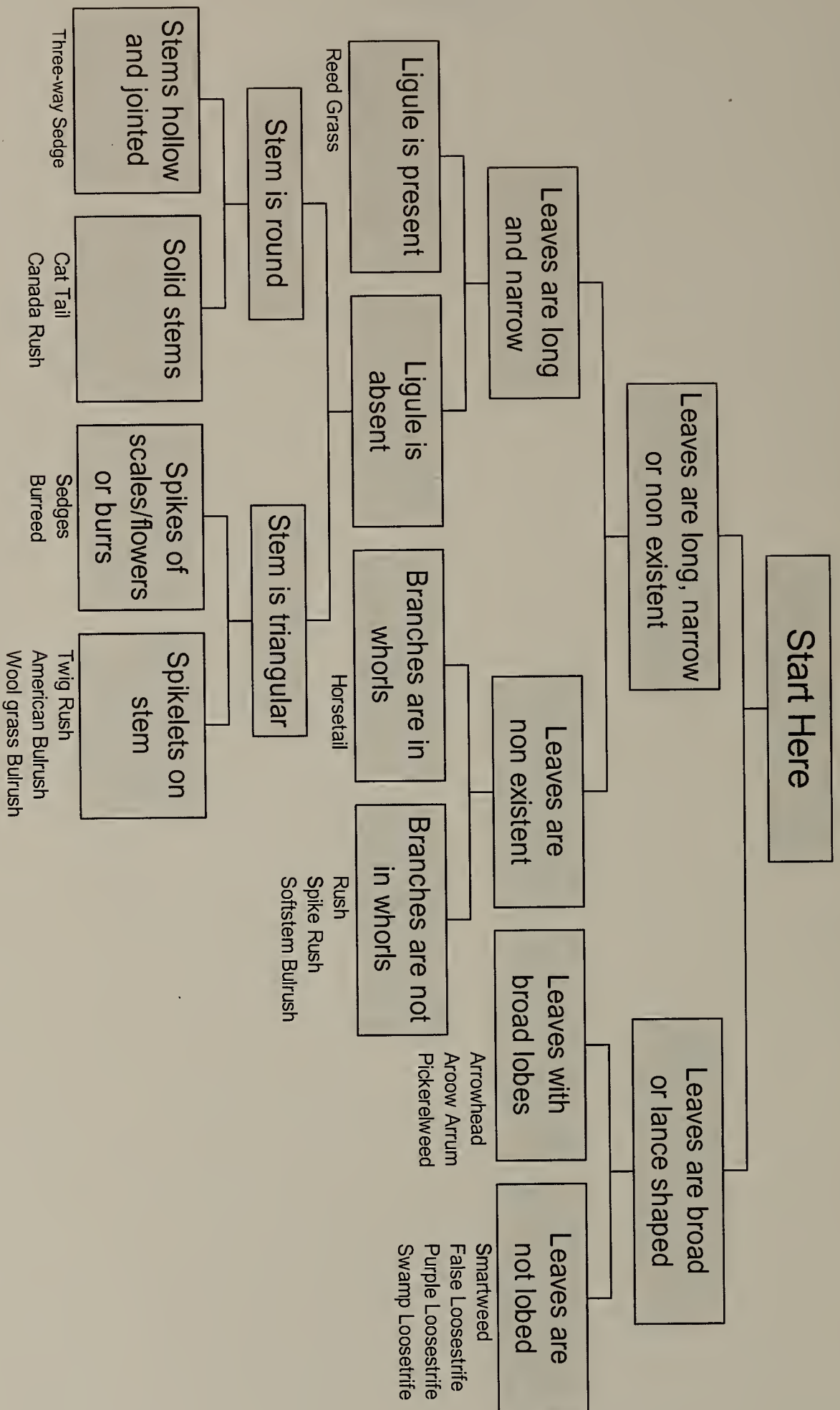
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# Notes

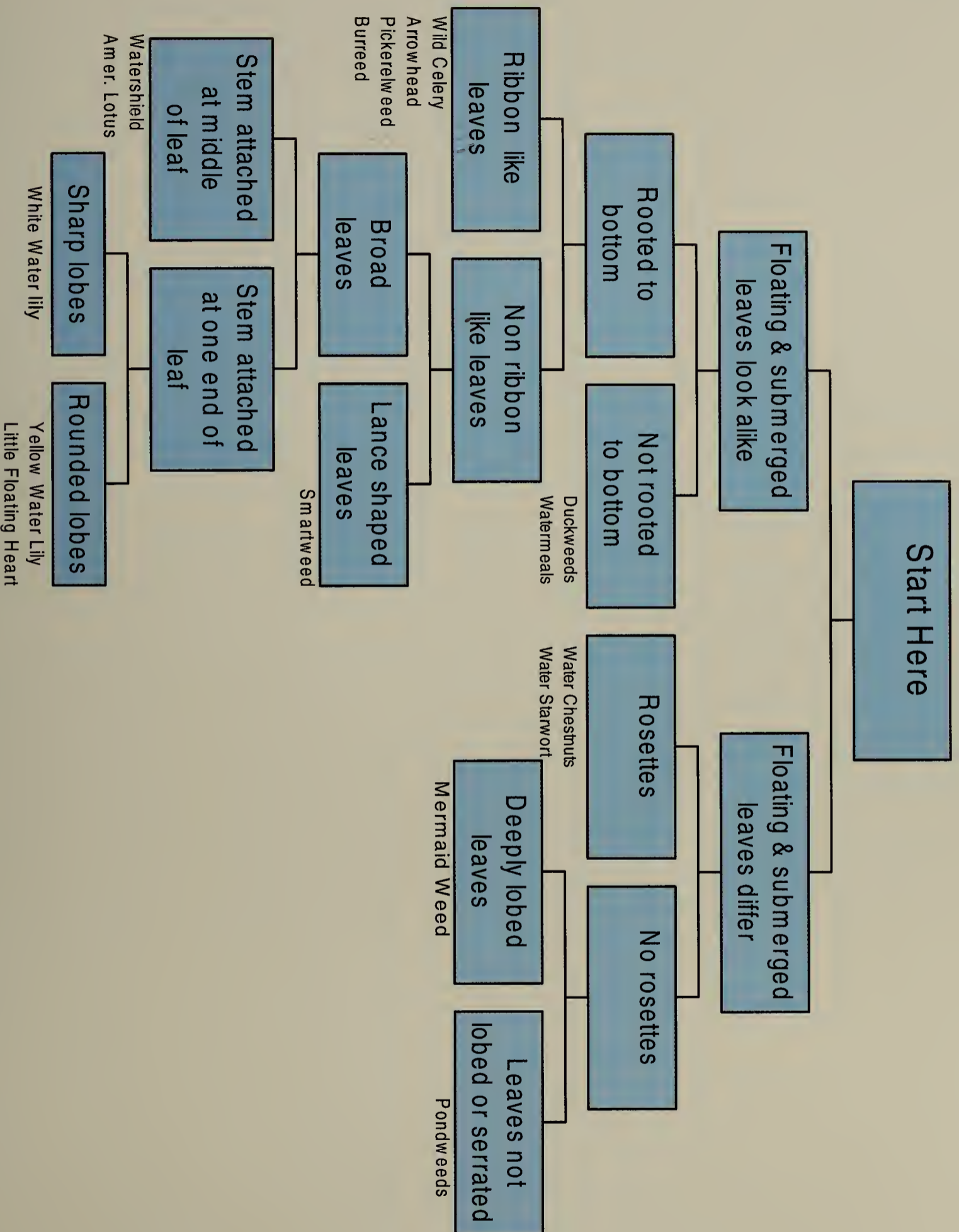


# Notes

# Quick Reference Chart Emergent Plants



# Quick Reference Chart Floating Leafed Plants



# Quick Reference Chart Submerged Plants

